



# STUDIES

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## AN ASSESSMENT OF CONTINUITY OF PATIENT CARE BETWEEN TWO PUBLIC HEALTH DEPARTMENT SERVICES: ONE USE OF THE NORTH CAROLINA HEALTH SERVICES INFORMATION SYSTEM (HSIS)

by

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### ABSTRACT

For women with live births during 1986, Health Services Information System files of maternal health and family planning services were linked in order to determine continuity of care between these services. Of the women with 1986 live births reported through maternal health services, 56% received family planning services within 90 days of giving birth. Thirty-six percent of the women who were closed out of family planning services due to pregnancy received maternal health services in a health department within 90 days. Most women who continued in maternal health did so within 60 days of closure of the family planning record, and the average delay was 37 days. Continuity of care varied considerably among smaller health departments, but among the larger departments it was positively related to the number of patients served. Evaluation of maternal health records of women with live births during 1987 showed that prior enrollment in family planning was significantly associated with reduced probability of a low-weight birth, and this effect was greatest with nonwhites. The data suggest that effectiveness of case management procedures varies considerably among health departments, and that continuity between maternal health and family planning programs is beneficial especially for the indigent population served by health departments.

## INTRODUCTION

Over the past 20 years, the national infant mortality rate has declined substantially; however, the rate for nonwhites has remained nearly twice that for whites, while the rate for whites has remained somewhat higher than the rates of a number of other developed countries (1). In North Carolina, the 1987 infant mortality rates for whites and nonwhites were 9.6 and 17.6, respectively, which represent increases following several years of constant declines in infant mortality rates for both whites and nonwhites.

Several national surveys have clearly documented the association between poverty and health, including the cycle of poverty, early pregnancy, higher fertility, lower education, and poorer health status (2). Within this context, two health department services for women—**family planning** and **maternal health**—are especially important. Fertility, especially for young women, is directly affected by contraception, and women, especially black women, with less than a high school education are more likely to utilize publicly subsidized clinics for family planning services (2). Once pregnant, early prenatal care remains the most cost-effective means of reducing unfavorable birth outcomes. Joyce et.al. (1) compared various health programs and found that initiation of prenatal care in the first trimester was the most cost-effective approach for reduction of low birthweight. Supplemental food programs (such as WIC) were also highly cost-effective; and teen family planning had a positive effect on low birthweight. Overall, these programs were found to be more cost-effective for blacks than for whites (1).

In North Carolina, most county health departments provide both family planning and prenatal care services to eligible women. The socio-economic profile of patients receiving these services includes disproportionately low income, unmarried, non-white, and less than a high school education—factors associated with unfavorable birth outcomes. The previously cited research implies that family planning can improve infant health by preventing unplanned pregnancies, and early prenatal care results in healthier babies. If these health department services improve birth outcomes for patients, then continuity between the two service areas (maternal health care and family planning) may be especially important. In short, case management—the movement of patients through an array of appropriate services—may increase utilization of health department services and thus improve patients' health outcomes. A higher proportion of pregnancies might be planned (wanted), and effective prenatal care might be initiated earlier in the pregnancy.

The Health Services Information System (HSIS) was implemented statewide by July 1, 1984, and has created a database of patient visits for selected services provided by county health departments. While the primary purpose of HSIS is to provide individual records and summary reports of services for health departments, the database can be analyzed to evaluate service-related issues, such as continuity of care, on a statewide basis.

The primary purpose of this study was to assess the effectiveness of case management, as measured by the rate of continuity between maternal care and family planning service components of health departments. A high level of continuity should indicate effective case management: patients have received services appropriate to their reproductive status. A secondary purpose was to determine whether prior participation in family planning affected subsequent birth outcomes (measured by birthweight) for women in maternal care. In other words, does continuity between these services areas have a measurable impact on birth outcome?

## PROCEDURES

All data were obtained from HSIS files from 1986 and 1987. To evaluate the continuity rate between maternal health services and family planning, patient records were matched in order to determine the percentages of women in one service that subsequently received the other service. The matching variable was the patient's HSIS ID number, which incorporates the patient's social security number (if she has one) and is unique for each patient across health departments. Data were gathered on enrollment in family planning within 180 days of live birth, or enrollment in maternal care within 180 days of closure of the family planning record due to pregnancy. Data were available from 87 family planning and 95 maternal health care sites.

The analysis of continuity involved two major steps. First, in order to determine continuity *from maternal health to family planning* services, records for women who gave birth in 1986 were matched to records of subsequent family planning visits at any site. In some instances, the first postpartum health department visit was coded as maternal health, perhaps because the woman needed additional ob-gyn services, or because of local health department coding procedures. Therefore, records coded as maternal health visits, dated up to 180 days after the live birth outcome, were added to the analysis.

The second step involved evaluation of continuity from family planning to maternal health. In this case, family planning records that were closed out by reason of pregnancy were matched to subsequent maternal (prenatal) visit records at *any site*. Again, maternal visits occurring within 180 days of closure of the family planning record were examined.

In order to assess effects on birth outcome of prior family planning services, all women who received maternal health services and reported live birth outcomes during 1987 were selected. The maternal health pregnancy outcome records for these women were then matched to family planning records, based on the patient's HSIS ID number, in order to determine which of these women had participated in family planning prior to pregnancy. Birth outcomes for this subset of women were then compared to birth outcomes of women in maternal health without previous participation in family planning in a health department.

## RESULTS: CONTINUITY FROM MATERNAL HEALTH TO FAMILY PLANNING SERVICES

A total of 14,094 live births in 1986 were reported on maternal health services pregnancy outcome records. Percentages of women with subsequent family planning visits were computed for 30-day intervals from 60 to 180 days after birth. Of the women with live births, 8,866 (almost 63%) received family planning services from a health department within 180 days of giving birth. Within 60 days postpartum, 76% of the women to eventually enter family planning had done so; and by the

90-day interval, a cumulative total of 89% of these women had entered family planning. Hence, nearly 90% of the women who would eventually enter family planning did so within the first three months postpartum, and relatively few women entered family planning more than 90 days after giving birth.

Continuity rates were computed for individual health departments. For the 50 departments reporting at least 100 births during 1986, continuity rates (percentage subsequently in family planning) at 90 days after the birth ranged from 6% to 85%. Statewide, the percentage was 56%. The four highest and lowest continuity rates are listed in Table 1 below, with percentages of women entering family planning within 90 days shown in the second column.

In order to evaluate the possibility that the initial postpartum visit was coded as maternal health rather than family planning, the previous analysis was replicated with the inclusion of both family planning and maternal health visits as criteria for continuation of care. The third column in Table 1 shows percentages of women to receive *either* maternal health or family planning services within 90 days of giving birth. Increases from the addition of postpartum visits coded as maternal care are small (four percent or less) for these eight counties. However, four other health departments with over 100 births reported did register large (11-24%) increases in continuity rates when postpartum maternity health visits were included as criteria for continuity. Whether these women receive family planning or ob-gyn services during postpartum maternal health visits cannot be determined from the data.

TABLE 1  
BY 90 DAYS AFTER BIRTH, PERCENT IN

DEPARTMENT (lowest 4)	NUMBER OF LIVE BIRTHS	FAMILY PLANNING	FAMILY PLANNING OR MATERNAL HEALTH
1	665	6%	9%
2	106	33%	37%
3	118	34%	36%
4	222	35%	38%
<i>(highest 4)</i>			
5	279	77%	78%
6	141	77%	77%
7	123	78%	80%
8	432	85%	86%

For county health departments reporting over 100 live births, the four lowest and four highest percents of maternity patients in family planning by 90 days postpartum.

Inspection of continuity rate data for health departments indicates that larger maternal health programs had higher percentages of women subsequently continuing in family planning. For the 49 programs with at least 100 live births reported, a Spearman correlation coefficient of +.84 was calculated between number of births and percent of women subsequently in family planning at 90 days after the birth. This indicates a high positive correlation between health department size and percentage of women with a live birth who continue in family planning.

### RESULTS: CONTINUITY FROM FAMILY PLANNING TO MATERNAL HEALTH

During 1986, a total of 4,535 women were recorded in HSIS as being closed out of family planning due to pregnancy. HSIS records were analyzed in order to determine the percentages of these women to begin maternal health services up to 180 days after closure of the family planning record.

Of the 4,535 women who became pregnant, 1,797 (40%) subsequently received maternal health services at a health department within 180 days. The average delay between the last family planning visit and the first maternal health visit was relatively brief (37 days). Hence family planning clients who chose to continue in maternal health did so relatively soon after becoming pregnant. By 60 days after closure from family planning, 82% of the women who were to continue in maternal health had done so.

Overall, 72% (3,264) of the pregnancies were planned, and the remaining 28% (1,271) were unplanned. Of the women with planned pregnancies, 43% continued in maternal health, compared to a 31% continuity rate for women with unplanned pregnancies. Hence the probability is greater that a woman will continue in maternal health through a health department if the pregnancy is planned.

From the 87 family planning services sites, Table 2 shows the 11 highest and lowest percentages of pregnant women to enter maternal health within 60 days of closure of the family planning record. Only the 31 sites reporting at least 50 family planning pregnancy closures were considered, since data from smaller sites may not be sufficiently reliable. Continuity rates from family planning to maternal health ranged from 7% to 72% among these 11 counties. The statewide average for sites with 50 or more closures was 33%.

County (lowest)	Number Of Pregnancies	Percent In Maternal Health
site 1	638	7%
site 2	64	11%
site 3	52	12%
site 4	104	12%
site 5	75	15%
site 6	53	15%
<b>(highest)</b>		
site 7	74	50%
site 8	143	50%
site 9	86	56%
site 10	261	62%
site 11	93	72%

The 11 family planning sites with highest and lowest percentages of pregnant women continuing in maternal health within 60 days. Each site reported at least 50 family planning closures due to pregnancy.

For the programs with 50 or more family planning closures, program size was positively associated with continuity into maternal care, with a Spearman correlation coefficient of +.33 at the 90-day interval.

### RESULTS: EFFECTS OF FAMILY PLANNING ON BIRTH OUTCOMES

Of 15,134 women with live births reported through maternal health services during 1987, about 31% (4,719) had previously received family planning services. The remaining 10,415 women (69%) had no records of prior family planning services in a health department.

The following table compares these two groups of women by low birthweight, trimester when prenatal care was initiated, and gestational age. A substantially higher percentage of the women previously in family planning initiated prenatal care within the first trimester. While differences between the two groups on birthweight and gestational age are small, they favor the family planning group.

**TABLE 3**

<b>LIVE BIRTH OUTCOME VARIABLE</b>	<b>WOMEN PREVIOUSLY IN FAMILY PLANNING</b>	<b>WOMEN PREVIOUSLY NOT IN FAMILY PLANNING</b>
Birthweight less than 2500 grams	8.9%	9.8%
Gestation age 36 weeks or less	8.0%	9.1%
Prenatal care begun during 1st trimester	32.8%	22.7%

Comparison of selected measures for women in and not in family planning prior to pregnancy.

Table 4 below compares the two groups on levels of variables that are historically associated with low birthweight. These include mother's age under 18, nonwhite, single parent, low income, and failure to finish high school.

Table 4 shows that the two groups of women are roughly balanced on education level and marital status. A substantially higher percentage of women who did not receive family planning services were under 18 years old; hence one effect of family planning services may be to support postponement

of pregnancy to a later age. The most visible difference is racial composition: the group that had received family planning services was 61.4% nonwhite, compared to 47.9% for the group that had not been in family planning. This is congruent with other data, which show that black women are substantially more likely than white women to use publicly subsidized family planning clinics (2). Overall, Table 4 shows that relatively high proportions of women utilizing health department services have demographic characteristics associated with unfavorable birth outcomes.

**TABLE 4**

<b>RISK FACTORS</b>	<b>WOMEN PREVIOUSLY IN FAMILY PLANNING</b>	<b>WOMEN PREVIOUSLY NOT IN FAMILY PLANNING</b>
Mother's age under 18	9.2%	17.9%
Race: Nonwhite	61.4%	47.9%
Not married	65.3%	64.1%
Income under \$5,000	49.8%	45.9%
Education less than 12th grade	51.3%	52.0%

Percentages of women in and not in family planning prior to pregnancy, by selected low birthweight risk factors.



The average birthweight among nonwhite women previously in family planning was 44 grams heavier than for nonwhite women not previously in family planning, whereas the average difference was only one gram for the two white subgroups. For nonwhites previously in family planning, 9.8% of the births were under 2500 grams, compared to 11.7% for nonwhites not previously in the program. For whites, the figures were 7.3% and 8.0% respectively. Being nonwhite is typically associated with an increased probability of low birthweight. In 1987, 12% of nonwhite births in North Carolina were under 2500 grams, compared to 6% for whites. The result of 9.8% under 2500 grams for nonwhites with prior participation in family planning, which is less than the overall statewide nonwhite percentage, suggests that the program may be having some positive impact on birth outcomes.

Overall, birthweights of babies whose mothers had received family planning services were only moderately better than those for women who had not been in family planning, possibly because of the substantially higher percentage of nonwhites in the former group. In order to statistically adjust for race and other risk factors in assessing a possible effect of family planning on subsequent birth outcomes, a logistic regression analysis was performed. The analysis showed that, with four risk factors (unmarried, under age 18, nonwhite, and education less than 12th grade) statistically controlled, women who had **not** received family planning services were 1.17 times as likely to have a low-weight birth as were their counterparts who had received family planning services. This association of family planning participation with birthweight is significant at  $p \leq .015$ .

The regression analysis also showed the primary importance of race. Controlling for the preceding factors, including whether or not family planning services were received, nonwhite women were found to be 1.38 times more likely to have a low birthweight infant than their white counterparts. This difference is highly significant.

In sum, the data show that a prior history of family planning services is associated with a slight positive shift in subsequent birthweight, and a stronger positive shift for nonwhites. Also, a higher proportion of women in family planning prior to pregnancy were over 18 when they became pregnant, and they were more likely to begin prenatal care during the first trimester.

## DISCUSSION

Interpretation of these data depends on the accuracy and consistency with which HSIS forms are completed as well as variations in health department coding policies and procedures. For example, some departments may not close family planning records when women become pregnant, thus would not be included in the analysis of continuity from family planning to maternal health. Also, variations in local practice patterns such that subsequent family planning or maternal health services are provided in the private sector could account for some of the low continuity rates derived from using the HSIS data.

With regard to continuity rates, the data show considerable variability among health departments. Larger health departments tend to have higher continuity rates, perhaps because they have more clearly articulated policies regarding case management. County-by-county results were provided to local health departments to help assess possible problems in both data quality and continuity of care, but these results have not been included in this summary report.

The improved birthweights for women (primarily nonwhite) who received family planning services prior to entering maternal health may be due to family planning services or may reflect an underlying tendency of these women to utilize available health care. One conjecture would be that family planning leads to more births being planned or wanted, and this may have a positive impact on birth outcome. Also, health education services provided in the family planning program may carry over into the prenatal period for women who become pregnant. Whether (or how) family planning services affect birthweight cannot be conclusively determined from these data, since all differences between the two groups on factors affecting low birthweight could not be measured and controlled. However, the overall value of continuity cannot be disputed: health departments serve a high-risk population, and increasing continuity between services may be a cost-effective method of improving utilization rates and therefore health status.

There may be considerable value in extending this analysis of continuity of care among health department services. For example, it would be interesting to assess the extent to which women who gave birth get their children into child health services within an appropriate period of time. Unfortunately, the data

to do this are not currently available. Prior to July 1988, child health records could not be linked to maternal health pregnancy outcome records because there was no common identifier between records for mother and child. Data must accrue for at least one year for even a preliminary analysis of this type of continuity of care.

The highly variable results across counties indicate that for some counties improvement in HSIS reporting procedures may be needed. The data also suggest that improvement in continuity between maternal health and family planning programs is beneficial for the indigent population that the health departments

serve, and that some health departments with continuity rates below the state average may need to improve case-management procedures.

## REFERENCES

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